

The number of subspecies of birds

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We now have a rather accurate estimate of the number of species of birds (9700). What uncertainty still exists is caused less by species still to be discovered than by differences of opinion on the status of geographically rather isolated forms; it is sometimes quite arbitrary whether to call them subspecies or allospecies. The recent raising in rank of many such forms, considered subspecies 20 or 30 years ago, to the rank of allospecies is the major reason for the rise of the number of species of birds from the earlier censuses of about 8600 to the latest count of 9672 in Sibley & Monroe (1990).

By contrast, no one in recent years has ventured to make a census or even merely a guess as to the number of avian subspecies. This is why Ernst Mayr, assisted by Jane Gerloff, decided to undertake such a census. This census is simply based on the figures contained in the 15 volumes of Peters' *Check-list of Birds of the World* (1934–1986). All such a census can achieve is to get the approximate order of magnitude of this figure.

There are five sources of inaccuracy for these figures.

1. Subspecies belonging to families treated in volumes 2–15 of the Peters' *Check-list* but described after the publication (1934, etc.) of the relevant volume are not included. For volume 1 the date of 1979, when the revised edition was published, is the cut-off date.

2. Invalid subspecies. No attempt was made to check the validity of any of the listed subspecies. There is little doubt that many forms described at the height of the subspecies-splitting period from the 1920s to the 1950s have been or will be synonymized in subsequent revisions.

3. Many particularly pronounced and highly isolated forms that were listed as subspecies in the volumes of Peters' *Check-list*, are now ranked as allospecies. Others surely will also be raised in rank resulting in a reduction of the number of subspecies and a corresponding increase in the number of allospecies (without affecting the total number of described forms). This great increase in the number of allospecies is the cause for the much larger number of species recorded by Sibley & Monroe than in Peters' *Check-list*.

4. Family revisions, undertaken since the completion of Peters' *Check-list* particularly by Sibley, have resulted in the shift of certain genera to other families. Since many of these shifts are controversial, none were here followed. They are of no relevance to the overall figures.

5. Counting errors.

| Classification Family | A | B | C | D | E | F | Ratios G | H |
|--------------------------|-----|---------------|-----|-------|-----------|--------------|---------------|---------------|
| | Gen | Species MT | PT | Total | Ssp PT | Total B+E | Ssp/sp E/D | Ssp/PT E/C |
| 1 Struthionidae | 1 | 0 | 1 | 1 | 5 | 5 | 5.00 | 5.00 |
| 2 Rheidae | 2 | 0 | 2 | 2 | 8 | 8 | 4.00 | 4.00 |
| 3 Casuariidae | 1 | 3 | 0 | 3 | 0 | 3 | 1.00 | 0.00 |
| 4 Dromaiidae | 1 | 1 | 1 | 2 | 2 | 3 | 1.50 | 2.00 |
| 5 Apterygidae | 1 | 2 | 1 | 3 | 3 | 5 | 1.67 | 3.00 |
| 6 Tinamidae | 9 | 21 | 25 | 46 | 128 | 149 | 3.24 | 5.12 |
| 7 Diomedidae | 2 | 8 | 5 | 13 | 11 | 19 | 1.46 | 2.20 |
| 8 Procellariidae | 12 | 39 | 21 | 60 | 67 | 106 | 1.77 | 3.19 |
| 9 Hydrobatidae | 8 | 13 | 8 | 21 | 24 | 37 | 1.76 | 3.00 |
| 10 Pelecanoididae | 1 | 3 | 1 | 4 | 6 | 9 | 2.25 | 6.00 |
| 11 Spheniscidae | 6 | 11 | 5 | 16 | 15 | 26 | 1.63 | 3.00 |
| 12 Gaviidae | 1 | 3 | 1 | 4 | 3 | 6 | 1.50 | 3.00 |
| 13 Podicipedidae | 6 | 9 | 11 | 20 | 41 | 50 | 2.50 | 3.73 |
| 14 Phaethontidae | 1 | 0 | 3 | 3 | 12 | 12 | 4.00 | 4.00 |
| 15 Frigateidae | 1 | 3 | 2 | 5 | 8 | 11 | 2.20 | 4.00 |
| 16 Phalacrocoracidae | 2 | 16 | 15 | 31 | 45 | 61 | 1.97 | 3.00 |
| 17 Sulidae | 1 | 5 | 4 | 9 | 13 | 18 | 2.00 | 3.25 |
| 18 Pelecanidae | 1 | 4 | 2 | 6 | 8 | 12 | 2.00 | 4.00 |
| 19 Ardeidae | 15 | 37 | 25 | 62 | 103 | 140 | 2.26 | 4.12 |
| 20 Scopidae | 1 | 0 | 1 | 1 | 2 | 2 | 2.00 | 2.00 |
| 21 Ciconiidae | 6 | 13 | 4 | 17 | 10 | 23 | 1.35 | 2.50 |
| 22 Balaenicipitidae | 1 | 1 | 0 | 1 | 0 | 1 | 1.00 | 0.00 |
| 23 Threskiornithidae | 13 | 19 | 9 | 28 | 30 | 49 | 1.75 | 3.33 |
| 24 Phoenicopteridae | 3 | 4 | 1 | 5 | 2 | 6 | 1.20 | 2.00 |
| 25 Cathartidae | 5 | 5 | 2 | 7 | 8 | 13 | 1.86 | 4.00 |
| 26 Accipitridae | 60 | 116 | 102 | 218 | 434 | 550 | 2.52 | 4.25 |
| 27 Sagittariidae | 1 | 1 | 0 | 1 | 0 | 1 | 1.00 | 0.00 |
| 28 Falconidae | 10 | 32 | 28 | 60 | 132 | 164 | 2.73 | 4.71 |
| 29 Anatidae | 43 | 106 | 44 | 150 | 140 | 246 | 1.64 | 3.18 |
| 30 Anhimidae | 2 | 3 | 0 | 3 | 0 | 3 | 1.00 | 0.00 |
| 31 Megapodiidae | 7 | 9 | 9 | 18 | 31 | 40 | 2.22 | 3.44 |
| 32 Cracidae | 11 | 26 | 19 | 45 | 64 | 90 | 2.00 | 3.37 |
| 33 Tetraonidae | 11 | 5 | 14 | 19 | 97 | 102 | 5.37 | 6.93 |
| 34 Phasianidae | 57 | 88 | 97 | 185 | 468 | 556 | 3.01 | 4.82 |
| 35 Numididae | 5 | 4 | 3 | 7 | 31 | 35 | 5.00 | 10.33 |
| 36 Meleagrididae | 2 | 1 | 1 | 2 | 5 | 6 | 3.00 | 5.00 |
| 37 Opisthocomidae | 1 | 1 | 0 | 1 | 0 | 1 | 1.00 | 0.00 |
| 38 Mesoenatidae | 2 | 3 | 0 | 3 | 0 | 3 | 1.00 | 0.00 |
| 39 Turnicidae | 2 | 6 | 8 | 14 | 45 | 51 | 3.64 | 5.63 |
| 40 Pedionomidae | 1 | 1 | 0 | 1 | 0 | 1 | 1.00 | 0.00 |
| 41 Gruidae | 4 | 9 | 5 | 14 | 14 | 23 | 1.64 | 2.80 |
| 42 Aramidae | 1 | 0 | 1 | 1 | 5 | 5 | 5.00 | 5.00 |
| 43 Psophiidae | 1 | 0 | 3 | 3 | 6 | 6 | 2.00 | 2.00 |
| 44 Rallidae | 52 | 82 | 56 | 138 | 251 | 333 | 2.41 | 4.48 |
| 45 Heliornithidae | 3 | 2 | 1 | 3 | 4 | 6 | 2.00 | 4.00 |
| 46 Rhynochetidae | 1 | 1 | 0 | 1 | 0 | 1 | 1.00 | 0.00 |
| 47 Eurypygidae | 1 | 0 | 1 | 1 | 3 | 3 | 3.00 | 3.00 |
| 48 Cariamidae | 2 | 2 | 0 | 2 | 0 | 2 | 1.00 | 0.00 |
| 49 Otidae | 11 | 11 | 13 | 24 | 37 | 48 | 2.00 | 2.85 |
| 50 Jacanidae | 6 | 5 | 2 | 7 | 12 | 17 | 2.43 | 6.00 |
| 51 Rostratulidae | 2 | 1 | 1 | 2 | 2 | 3 | 1.50 | 2.00 |
| 52 Haematopodidae | 1 | 2 | 2 | 4 | 19 | 21 | 5.25 | 9.50 |
| 53 Charadriidae | 33 | 42 | 19 | 61 | 60 | 102 | 1.67 | 3.16 |
| 54 Scolopacidae | 29 | 61 | 22 | 83 | 59 | 120 | 1.45 | 2.68 |
| 55 Recurvirostridae | 4 | 6 | 1 | 7 | 6 | 12 | 1.71 | 6.00 |
| 56 Phalaropodidae | 3 | 3 | 0 | 3 | 0 | 3 | 1.00 | 0.00 |
| 57 Dromadidae | 1 | 1 | 0 | 1 | 0 | 1 | 1.00 | 0.00 |
| 58 Burhinidae | 3 | 3 | 6 | 9 | 23 | 26 | 2.89 | 3.83 |
| 59 Glareolidae | 6 | 7 | 10 | 17 | 37 | 44 | 2.59 | 3.70 |
| 60 Thinocoridae | 2 | 0 | 4 | 4 | 12 | 12 | 3.00 | 3.00 |

| Classification Family | A Gen | B Species | | D Total | E Ssp PT | F Total B+E | Ratios | |
|--------------------------|----------|--------------|-----|------------|----------------|-------------------|--------------------|--------------------|
| | | MT | PT | | | | G Ssp/sp E/D | H Ssp/PT E/C |
| 61 Chionididae | 1 | 1 | 1 | 2 | 4 | 5 | 2.50 | 4.00 |
| 62 Stercorariidae | 2 | 3 | 1 | 4 | 7 | 10 | 2.50 | 7.00 |
| 63 Laridae | 17 | 54 | 31 | 85 | 131 | 185 | 2.18 | 4.23 |
| 64 Rynchopidae | 1 | 2 | 1 | 3 | 4 | 6 | 2.00 | 4.00 |
| 65 Alcidae | 13 | 16 | 7 | 23 | 21 | 37 | 1.61 | 3.00 |
| 66 Pteroclididae | 2 | 4 | 12 | 16 | 41 | 45 | 2.81 | 3.42 |
| 67 Raphidae-[extinct] | 1 | 2 | 0 | 2 | 0 | 2 | 1.00 | 0.00 |
| 68 Columbidae | 59 | 136 | 171 | 307 | 705 | 841 | 2.74 | 4.12 |
| 69 Psittacidae | 81 | 164 | 171 | 335 | 614 | 778 | 2.32 | 3.59 |
| 70 Musophagidae | 6 | 6 | 14 | 20 | 37 | 43 | 2.15 | 2.64 |
| 71 Cuculidae | 38 | 61 | 68 | 129 | 296 | 357 | 2.77 | 4.35 |
| 72 Tytonidae | 2 | 4 | 6 | 10 | 56 | 60 | 6.00 | 9.33 |
| 73 Strigidae | 27 | 52 | 81 | 133 | 482 | 534 | 4.02 | 5.95 |
| 74 Steatornithidae | 1 | 1 | 0 | 1 | 0 | 1 | 1.00 | 0.00 |
| 75 Podargidae | 2 | 6 | 6 | 12 | 23 | 29 | 2.42 | 3.83 |
| 76 Nyctibiidae | 1 | 2 | 3 | 5 | 12 | 14 | 2.80 | 4.00 |
| 77 Aegothelidae | 1 | 2 | 5 | 7 | 15 | 17 | 2.43 | 3.00 |
| 78 Caprimulgidae | 19 | 22 | 47 | 69 | 182 | 204 | 2.96 | 3.87 |
| 79 Apodidae | 16 | 34 | 40 | 74 | 185 | 219 | 2.96 | 4.63 |
| 80 Hemiprocidae | 1 | 0 | 3 | 3 | 15 | 15 | 5.00 | 5.00 |
| 81 Trochilidae | 123 | 179 | 152 | 331 | 509 | 688 | 2.08 | 3.35 |
| 82 Coliidae | 1 | 2 | 4 | 6 | 27 | 29 | 4.83 | 6.75 |
| 83 Trogonidae | 8 | 8 | 26 | 34 | 95 | 103 | 3.03 | 3.65 |
| 84 Alcedinidae | 14 | 22 | 67 | 89 | 315 | 337 | 3.79 | 4.70 |
| 85 Todidae | 1 | 5 | 0 | 5 | 0 | 5 | 1.00 | 0.00 |
| 86 Momotidae | 6 | 2 | 6 | 8 | 43 | 45 | 5.63 | 7.17 |
| 87 Meropidae | 7 | 12 | 12 | 24 | 38 | 50 | 2.08 | 3.17 |
| 88 Leptosomatidae | 1 | 0 | 1 | 1 | 3 | 3 | 3.00 | 3.00 |
| 89 Coraciidae | 5 | 9 | 7 | 16 | 28 | 37 | 2.31 | 4.00 |
| 90 Upupidae | 1 | 0 | 1 | 1 | 9 | 9 | 9.00 | 9.00 |
| 91 Phoeniculidae | 2 | 0 | 6 | 6 | 27 | 27 | 4.50 | 4.50 |
| 92 Bucconidae | 12 | 17 | 29 | 46 | 87 | 104 | 2.26 | 3.00 |
| 93 Galbulidae | 5 | 8 | 8 | 16 | 30 | 38 | 2.38 | 3.75 |
| 94 Bucconidae | 10 | 13 | 20 | 33 | 63 | 76 | 2.30 | 3.15 |
| 95 Capitonidae | 13 | 22 | 56 | 78 | 233 | 255 | 3.27 | 4.16 |
| 96 Indicatoridae | 4 | 6 | 7 | 13 | 30 | 36 | 2.77 | 4.29 |
| 97 Ramphastidae | 5 | 23 | 18 | 41 | 64 | 87 | 2.12 | 3.56 |
| 98 Picidae | 38 | 67 | 147 | 214 | 788 | 855 | 4.00 | 5.36 |
| 99 Eurylaimidae | 8 | 3 | 11 | 14 | 56 | 59 | 4.21 | 5.09 |
| 100 Dendrocolaptidae | 13 | 9 | 39 | 48 | 251 | 260 | 5.42 | 6.44 |
| 101 Furnariidae | 58 | 109 | 109 | 218 | 441 | 550 | 2.52 | 4.05 |
| 102 Formicariidae | 53 | 90 | 134 | 224 | 594 | 684 | 3.05 | 4.43 |
| 103 Conopophagidae | 2 | 5 | 6 | 11 | 20 | 25 | 2.27 | 3.33 |
| 104 Rhinocryptidae | 12 | 13 | 14 | 27 | 50 | 63 | 2.33 | 3.57 |
| 105 Tyrannidae | 89 | 173 | 219 | 392 | 936 | 1109 | 2.83 | 4.27 |
| 106 Pipridae | 17 | 27 | 24 | 51 | 122 | 149 | 2.92 | 5.08 |
| 107 Cotingidae | 25 | 44 | 17 | 61 | 49 | 93 | 1.52 | 2.88 |
| 108 Oxyruncidae | 1 | 0 | 1 | 1 | 7 | 7 | 7.00 | 7.00 |
| 109 Phytotomidae | 1 | 2 | 1 | 3 | 2 | 4 | 1.33 | 2.00 |
| 110 Pittidae | 1 | 10 | 16 | 26 | 90 | 100 | 3.85 | 5.63 |
| 111 Philepittidae | 2 | 4 | 0 | 4 | 0 | 4 | 1.00 | 0.00 |
| 112 Acanthisittidae | 2 | 2 | 2 | 4 | 5 | 7 | 1.75 | 2.50 |
| 113 Menuridae | 1 | 1 | 1 | 2 | 2 | 3 | 1.50 | 2.00 |
| 114 Atrichornithidae | 1 | 1 | 1 | 2 | 2 | 3 | 1.50 | 2.00 |
| 115 Alaudidae | 15 | 28 | 48 | 76 | 354 | 382 | 5.03 | 7.38 |
| 116 Hirundinidae | 20 | 35 | 44 | 79 | 172 | 207 | 2.62 | 3.91 |
| 117 Motacillidae | 5 | 25 | 29 | 54 | 159 | 184 | 3.41 | 5.48 |
| 118 Campephagidae | 9 | 20 | 50 | 70 | 298 | 318 | 4.54 | 5.96 |
| 119 Pycnonotidae | 15 | 43 | 77 | 120 | 353 | 396 | 3.30 | 4.58 |
| 120 Irenidae | 3 | 3 | 11 | 14 | 54 | 57 | 4.07 | 4.91 |

| Classification Family | A | B | C | D | E | F | Ratios G | H |
|--------------------------|------|---------------|------|-------|-----------|--------------|---------------|---------------|
| | Gen | Species MT | PT | Total | Ssp PT | Total B+E | Ssp/sp E/D | Ssp/PT E/C |
| 121 Laniidae | 12 | 26 | 48 | 74 | 231 | 257 | 3.47 | 4.81 |
| 122 Vangidae | 8 | 7 | 5 | 12 | 10 | 17 | 1.42 | 2.00 |
| 123 Bombycillidae | 5 | 5 | 3 | 8 | 9 | 14 | 1.75 | 3.00 |
| 124 Dulidae | 1 | 1 | 0 | 1 | 0 | 1 | 1.00 | 0.00 |
| 125 Cinclidae | 1 | 0 | 4 | 4 | 23 | 23 | 5.75 | 5.75 |
| 126 Troglodytidae | 14 | 12 | 47 | 59 | 345 | 357 | 6.05 | 7.34 |
| 127 Mimidae | 13 | 12 | 19 | 31 | 73 | 85 | 2.74 | 3.84 |
| 128 Prunellidae | 1 | 4 | 8 | 12 | 30 | 34 | 2.83 | 3.75 |
| 129 Turdidae | 49 | 119 | 188 | 307 | 880 | 999 | 3.25 | 4.68 |
| 130 Timaliidae | 65 | 94 | 203 | 297 | 960 | 1002 | 3.37 | 4.73 |
| 131 Sylviidae | 60 | 124 | 234 | 358 | 1105 | 1229 | 3.43 | 4.72 |
| 132 Muscicapidae | 9 | 41 | 66 | 107 | 271 | 312 | 2.92 | 4.11 |
| 133 Platysteiridae | 4 | 15 | 15 | 30 | 44 | 59 | 1.97 | 2.93 |
| 134 Maluridae | 4 | 9 | 16 | 25 | 56 | 65 | 2.60 | 3.50 |
| 135 Acanthizidae | 17 | 30 | 42 | 72 | 177 | 207 | 2.88 | 4.21 |
| 136 Monarchidae | 20 | 50 | 78 | 128 | 403 | 453 | 3.54 | 5.17 |
| 137 Eopsaltriidae | 11 | 13 | 26 | 39 | 107 | 120 | 3.08 | 4.12 |
| 138 Pachycephalidae | 10 | 11 | 35 | 46 | 259 | 270 | 5.87 | 7.40 |
| 139 Aegithalidae | 3 | 3 | 5 | 8 | 40 | 43 | 5.38 | 8.00 |
| 140 Remizidae | 4 | 4 | 6 | 10 | 24 | 28 | 2.80 | 4.00 |
| 141 Paridae | 4 | 12 | 35 | 47 | 218 | 230 | 4.89 | 6.23 |
| 142 Sittidae | 4 | 7 | 18 | 25 | 88 | 95 | 3.80 | 4.89 |
| 143 Certhiidae | 2 | 2 | 4 | 6 | 36 | 38 | 6.33 | 9.00 |
| 144 Rhabdornithidae | 1 | 0 | 2 | 2 | 2 | 8 | 4.00 | 1.00 |
| 145 Climacteridae | 1 | 2 | 4 | 6 | 13 | 15 | 2.50 | 3.25 |
| 146 Dicaeidae | 7 | 18 | 40 | 58 | 167 | 185 | 3.19 | 4.18 |
| 147 Nectariniidae | 5 | 41 | 75 | 116 | 352 | 393 | 3.39 | 4.69 |
| 148 Zosteropidae | 11 | 44 | 38 | 82 | 197 | 241 | 2.94 | 5.18 |
| 149 Meliphagidae | 39 | 77 | 95 | 172 | 380 | 457 | 2.66 | 4.00 |
| 150 Emberizidae | 133 | 236 | 316 | 552 | 1496 | 1732 | 3.14 | 4.73 |
| 151 Parulidae | 27 | 64 | 59 | 123 | 309 | 373 | 3.03 | 5.24 |
| 152 Drepanididae | 12 | 14 | 7 | 21 | 25 | 39 | 1.86 | 3.57 |
| 153 Vireonidae | 4 | 18 | 25 | 43 | 148 | 166 | 3.86 | 5.92 |
| 154 Icteridae | 25 | 42 | 49 | 91 | 214 | 256 | 2.81 | 4.37 |
| 155 Fringillidae | 20 | 48 | 74 | 122 | 357 | 405 | 3.32 | 4.82 |
| 156 Estrildidae | 28 | 51 | 75 | 126 | 291 | 342 | 2.71 | 3.88 |
| 157 Ploceidae | 19 | 67 | 76 | 143 | 291 | 358 | 2.50 | 3.83 |
| 158 Sturnidae | 26 | 60 | 51 | 111 | 176 | 236 | 2.13 | 3.45 |
| 159 Oriolidae | 2 | 10 | 18 | 28 | 73 | 83 | 2.96 | 4.06 |
| 160 Dicruridae | 2 | 8 | 12 | 20 | 90 | 98 | 4.90 | 7.50 |
| 161 Callaeidae | 3 | 1 | 2 | 3 | 4 | 5 | 1.67 | 2.00 |
| 162 Grallinidae | 3 | 4 | 0 | 4 | 0 | 4 | 1.00 | 0.00 |
| 163 Artamidae | 1 | 6 | 4 | 10 | 19 | 25 | 2.50 | 4.75 |
| 164 Cracticidae | 3 | 2 | 8 | 10 | 34 | 36 | 3.60 | 4.25 |
| 165 Ptilonorhynchidae | 8 | 7 | 10 | 17 | 33 | 40 | 2.35 | 3.30 |
| 166 Paradisaeidae | 20 | 13 | 27 | 40 | 98 | 111 | 2.78 | 3.63 |
| 167 Corvidae | 26 | 55 | 48 | 103 | 298 | 353 | 3.43 | 6.21 |
| Totals | 2129 | 3963 | 4931 | 8894 | 22,243 | 26,206 | 2.50 | 4.51 |

Contents of the Columns

A=Genera

B=Monotypic Species

C=Polytypic Species

D=Total number of Species in the family (B+C)

E=Number of subspecies in the polytypic species (nominate subspecies included)

F=Total number of forms (B+E)

G=Average number of Subspecies per Species (E/D)

H=Average number of Subspecies per Polytypic Species (E/C)

Totals

In the 167 families of birds recognized in Peters' *Check-list*, 8894 species are listed. Of these, 3963 are monotypic (i.e., without subspecies), while 4931 are considered polytypic. The total number of listed subspecies (including the nominate one) in these polytypic species is 22,243; not including the nominate subspecies in this total reduces the number of subspecies to 17,289. The total number of listed named forms, i.e. all subspecies and monotypic species, is 26,206. This grand total is apt to be reasonably stable since it is not affected by the shift of rank of a subspecies to an allospecies. Also, the sinking of subspecies now considered invalid but recognized in Peters' *Check-list* and the subsequent recognition of new subspecies (not included in Peters' *Check-list*) will balance each other to some extent. However, more valid subspecies were presumably published in the nearly sixty years since the publication of vol. 2 (1934), than invalid ones are included that are to be synonymized. The real total of valid named forms is therefore presumably somewhere between 27,000 and 28,000.

We have tried to arrive at some generalizations on subspeciation. Oceanic bird species usually have fewer subspecies than land birds. Non-Passerés on average have fewer subspecies (usually less than three) than Passerés (usually more than three). Families with few species vary naturally the most, ranging from containing only monotypic species, like the Todidae, to having only a single but polytypic species with 9 subspecies (Upupidae). Two factors seem to be primarily responsible for the number of subspecies: the stability of the phenotype and the dispersal-colonization propensity of the group, in other words, a genetic and an ecological factor. One must undertake a species by species analysis if one wants to get beyond these very modest generalizations.

References:

- Peters, J. L. 1934–1986. *Check-list of Birds of the World*. Museum of Comparative Zoology, Cambridge.
Sibley, C. G. & Monroe, B. L. 1990. *Distribution and Taxonomy of Birds of the World*. Yale Univ. Press.

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